

Diblock Copolymers Composed of Liquid Crystalline Azo block and Poly(dimethylsiloxane) Block: Synthesis, Morphology and Photoresponsive Properties

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Supporting information

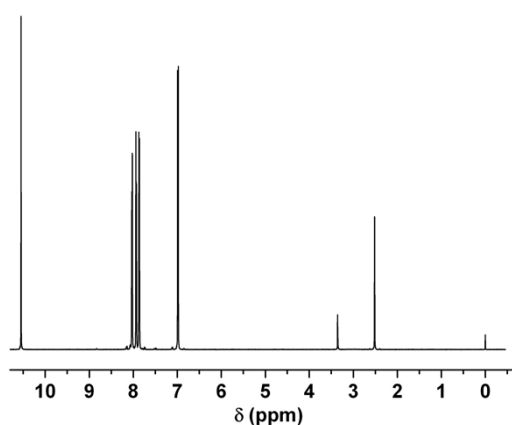


Fig. S1 ¹H NMR spectrum of 4-cyano-4'-hydroxyazobenzene.

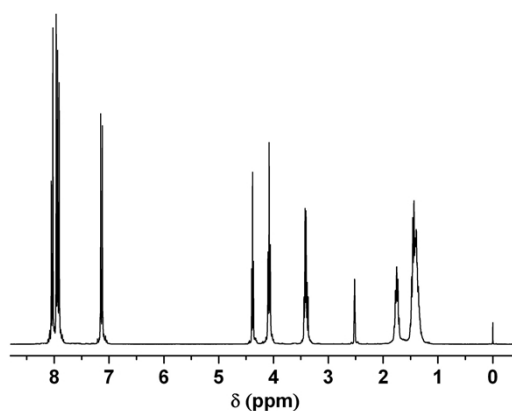


Fig. S2 ¹H NMR spectrum of 4-cyano-4'-(6-hydroxyhexyloxy)azobenzene.

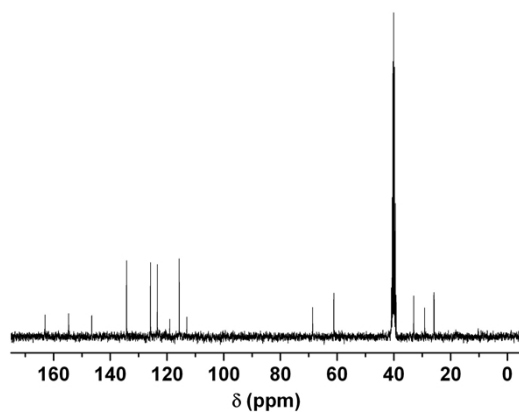


Fig. S3 ^{13}C NMR spectrum of 4-cyano-4'-(6-hydroxyhexyloxy)azobenzene.

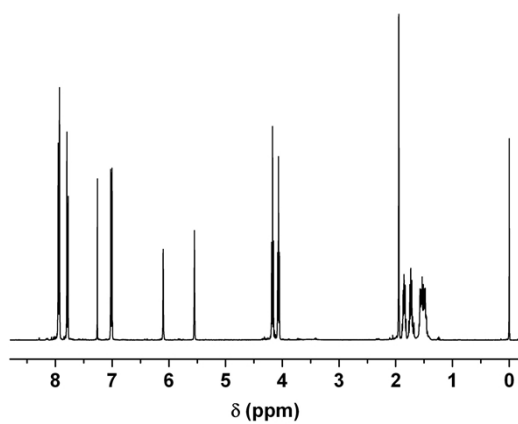


Fig. S4 ^1H NMR spectrum of 6-(4-(4'-cyanophenylazo)phenoxy)-hexyl acrylate (OCN).

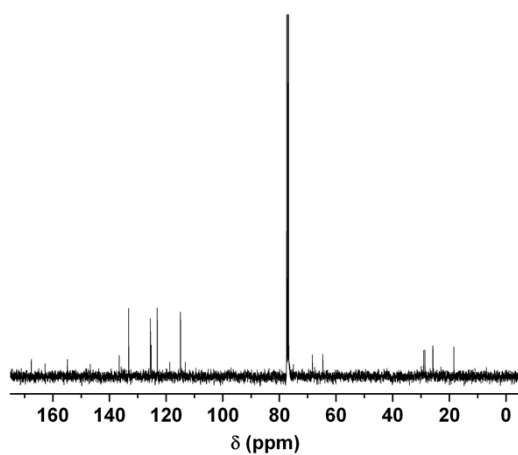


Fig. S5 ^{13}C NMR spectrum of 6-(4-(4'-cyanophenylazo)phenoxy)-hexyl acrylate (OCN).

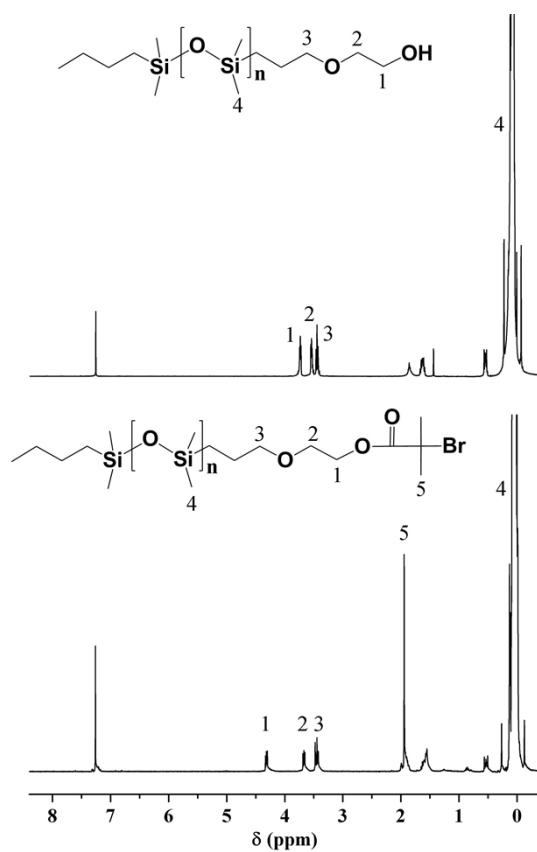


Fig. S6 ^1H NMR spectra of PDMS-OH and PDMS-Br.

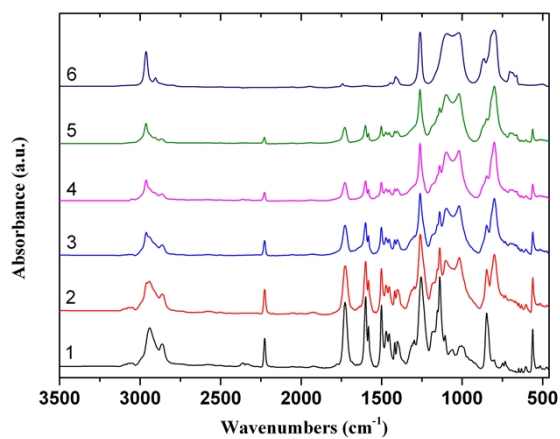
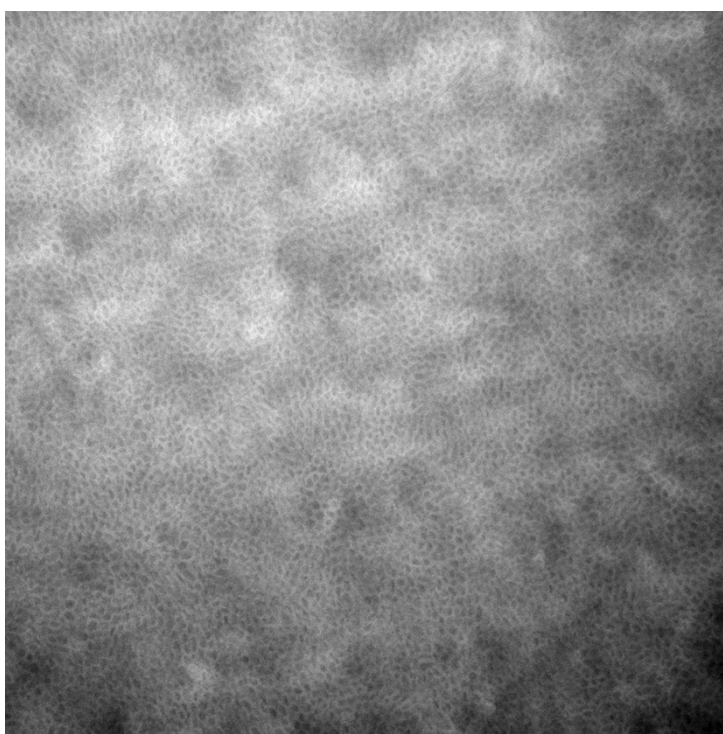


Fig. S7 FT-IR spectra of the polymers: (1) POCN, (2) PDMS₅₈-*b*-POCN₃₆, (3) PDMS₅₈-*b*-POCN₂₄, (4) PDMS₅₈-*b*-POCN₁₅, (5) PDMS₅₈-*b*-POCN₈, (6) PDMS-Br.



15-1.tif
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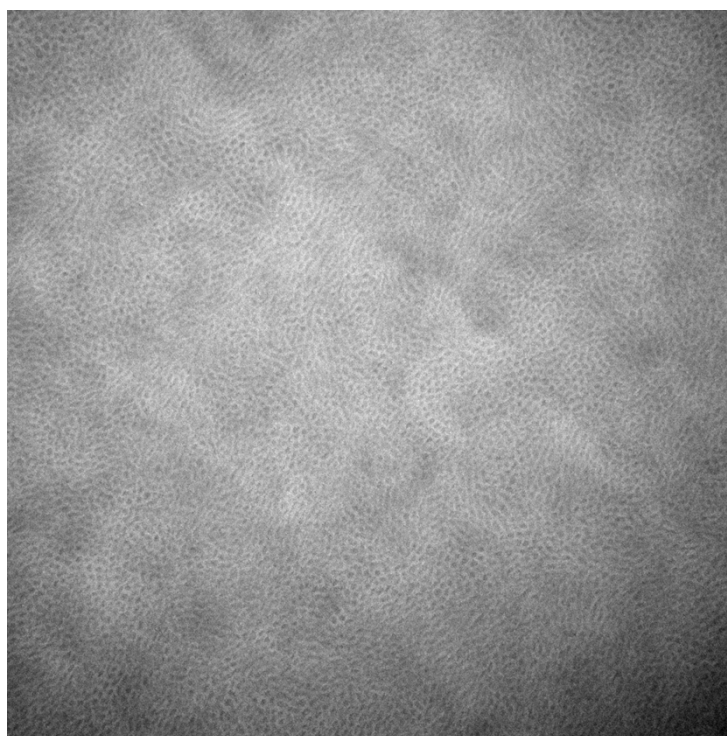
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15-4.tif
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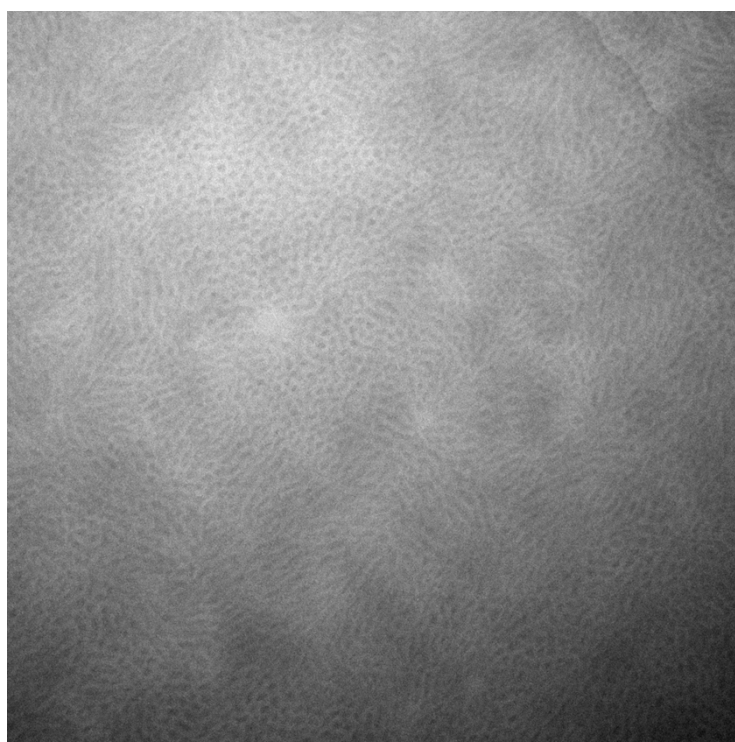
100 nm

Fig. S8 Typical TEM images of PDMS₅₈-*b*-POCN₂₄.



3-1.tif
13:33 12-06-13

100 nm



3-6.tif
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100 nm

Fig. S9 Typical TEM images of PDMS₅₈-*b*-POCN₃₆.

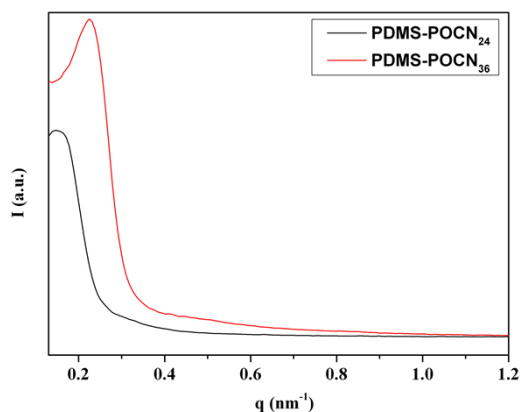


Fig. S10 Small-angle X-ray scattering (SAXS) profiles of two diblock copolymers at room temperature. The 1D SAXS experiment was performed with a high-flux SAXS instrument (SAXSess, Anton Paar) equipped with Kratky block-collimation system and a Philips PW3830 sealed-tube X-ray generator (Cu K_{α}).

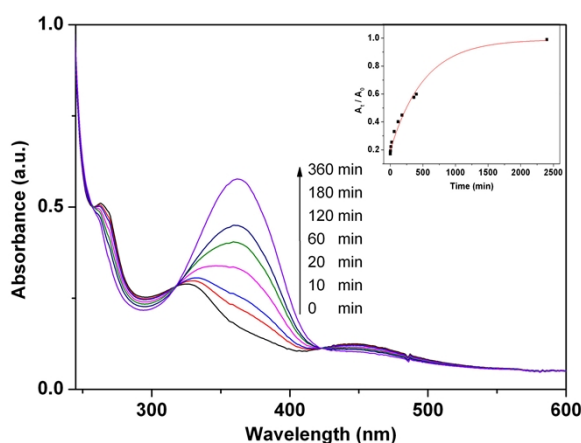


Fig. S11 The thermal *cis-trans* isomerization kinetics of the solution of PDMS-*b*-POCN₈ in dark at room temperature after the irradiated with UV light (365 nm) for 5 min. The inset is the relative absorbance (λ_{357}) in different time intervals and the corresponding fitted curve.

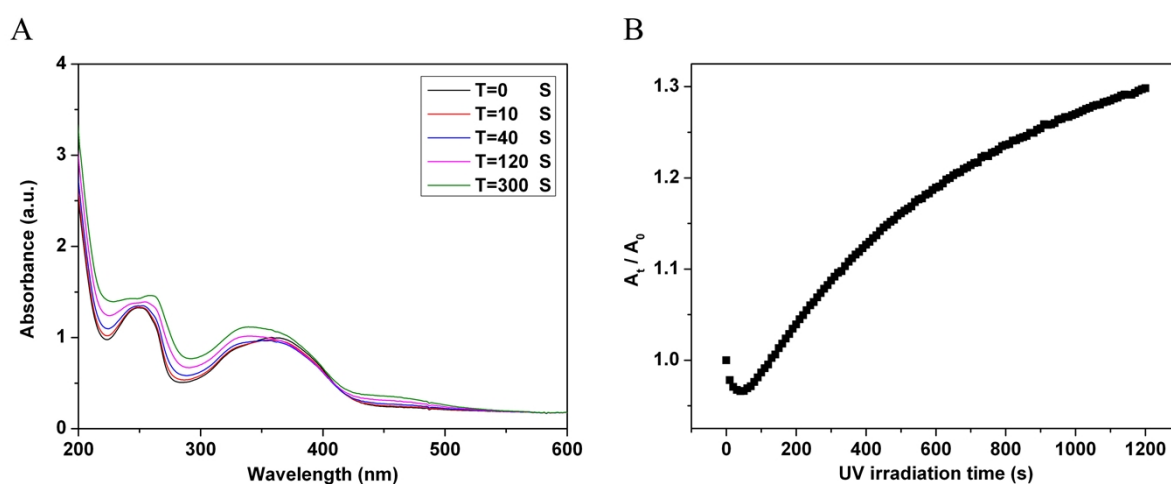


Fig. S12 (A) The *trans-cis* photoisomerization kinetics of the annealed POCN film

under the irradiation with the UV light at 365 nm; (B) the relative absorbance (λ_{357}) of the annealed POCN film in different time intervals when irradiated with the UV light at 365 nm.

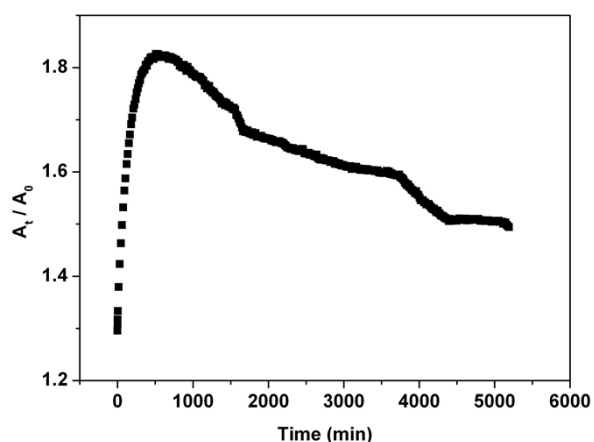


Fig. S13 The relative absorbance (λ_{357}) of the annealed POCN film in different time intervals in dark after irradiated by the UV light at 365 nm for 20 min.

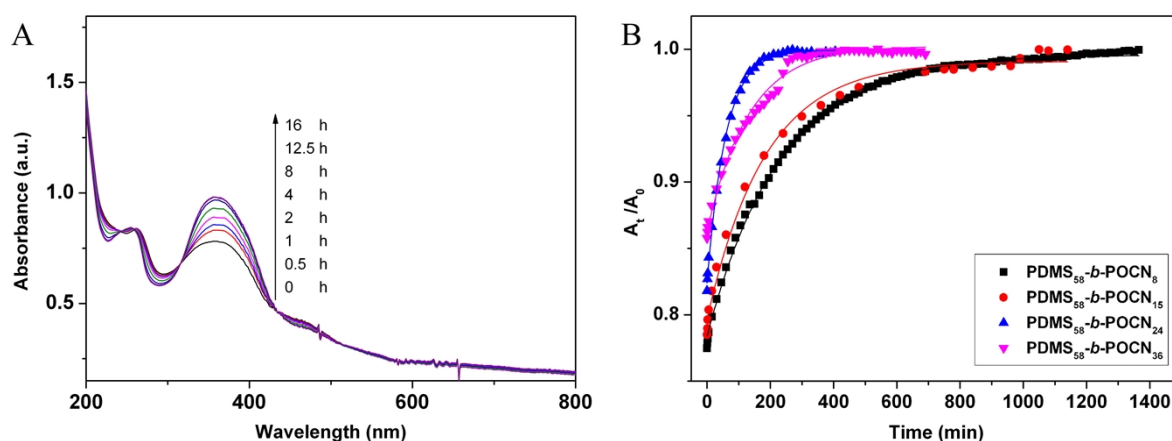


Fig. S14 (A) The thermal *cis-trans* isomerization kinetics of the annealed film of PDMS-*b*-POCN₁₅ in dark at RT after irradiated with the UV light at 365 nm for 5 min; (B) the relative absorbance (λ_{357}) of the annealed films of the diblock copolymers in different time intervals in dark at RT after irradiated with the UV light at 365 nm for 5 min.

Table S1. The parameters of photoisomerization of the polymers in solutions obtained from the curve-fitting by using equation $A_t/A_0 = A + B \exp(-t/T)$

	R^2	A	B	T
POCN	0.992	0.140 ± 0.023	0.888 ± 0.025	43.7 ± 3.7
PDMS ₅₈ - <i>b</i> -POCN ₈	0.991	0.119 ± 0.023	0.913 ± 0.026	42.2 ± 3.6
PDMS ₅₈ - <i>b</i> -POCN ₁₅	0.991	0.150 ± 0.018	0.850 ± 0.024	34.2 ± 2.8
PDMS ₅₈ - <i>b</i> -POCN ₂₄	0.990	0.142 ± 0.019	0.867 ± 0.026	32.9 ± 2.8
PDMS ₅₈ - <i>b</i> -POCN ₃₆	0.991	0.133 ± 0.019	0.897 ± 0.026	34.7 ± 2.8